



THE OMNICARE

# HealthLine

## Focus on Catheter-Associated Urinary Tract Infections: Part 2

- by Allen Lefkowitz

**A**voiding the use and limiting the duration of use of urinary catheters are the “most effective prevention strategies” for catheter-associated urinary tract infections (CAUTI). But up to 380,000 infections and 9,000 deaths related to CAUTI could be prevented with implementation of evidence-based practices according to the Association for Professionals in Infection Control (APIC). Please refer to the July 2017 focus article for additional information on prevention of CAUTI. Even with evidence-based practices however, it is recognized that these efforts to prevent CAUTI cannot eliminate all cases. For example with short-term use of a urinary catheter, the risk of CAUTI increases by 5% for each day it remains in place. Likewise, with long-term indwelling catheters, the daily rate of newly acquiring an infection ranges from 3-10%, and the incidence of bacteremia is approximately 40-times greater than in individuals without a long-term indwelling catheter.

As mentioned within the CDC’s Core Elements documents, asymptomatic bacteriuria approaches 100% in long-term care (LTC) residents with long-term urinary catheters. Antimicrobial treatment for asymptomatic bacteriuria has been deemed inappropriate since it does not decrease the risk of symptomatic infection and it may lead to an increase in drug-resistant organisms. This makes the prompt identification of CAUTI imperative. Most cases of CAUTI are due to the natural flora of the perineum; however, up to one-third of CAUTI are believed to be due to contamination, primarily resulting from

inadequate hand hygiene from healthcare personnel. In LTC, the most common pathogen associated with CAUTI is *Escherichia coli* (~40%); however, *Klebsiella* spp, *Proteus* spp, and *Morganella* spp are also common. Other pathogens more common in hospitals (especially intensive care units) include *Candida*, *Pseudomonas aeruginosa*, *Enterococcus* spp and *Enterobacter* spp. Likewise, CAUTI associated with long-term use of catheters are considered polymicrobial in up to 95% of all cases. Also significant is the fact that use of an indwelling catheter is a significant risk factor for infection with multi-drug resistant organisms (MDRO), such as extended-spectrum  $\beta$ -lactamase (ESBL)-producing or carbapenem-resistant Enterobacteriaceae.

The presence of malodorous and/or cloudy urine alone are not an indication for ordering a urine culture or treatment with antibiotics. While different criteria exist, signs and symptoms consistent with CAUTI include:

- Costovertebral tenderness
- Rigors (chill)
- Fever > 100.4°F (or an increase of 1.5°F above baseline)
- Delirium
- Gross hematuria
- Hypotension
- Leukocytosis
- Nausea
- Back/flank/suprapubic pain, and/or
- In males, acute pain or swelling of the scrotum, testes, epididymis, or prostate.

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According to a 2014 survey (published in January 2017) of over 1,600 licensed personnel and unlicensed personnel in nursing homes, only 61.4% and 26.6% of personnel respectively were able to identify that fever, but not a change in urine color, urine odor or cloudiness is a clinically significant CAUTI symptom that warrants a urine culture. Likewise, nearly 40% of licensed personnel incorrectly believed that urine cultures should be assessed upon the admission of a patient with a catheter.

In patients with a spinal cord injury, symptoms suggestive of CAUTI include: fever, pain over the kidney or bladder during urination, increased spasticity, autonomic dysreflexia (i.e., a sudden onset of excessively high blood pressure), and/or sense of unease.

In addition to the observance of the various signs and symptoms, prior to initiating therapy, a urine sample should be obtained for a culture and sensitivity (C&S), either from a catheter that has been in place less than 2 weeks or from a newly changed catheter. In addition to producing more accurate C&S results, replacing a catheter prior to initiating treatment is associated with improved clinical outcomes including more rapid fever resolution and decreased risk of relapse within 1 month after discontinuation of antimicrobial therapy. Urine cultures should not be collected from drainage bags.

In cases where criteria for CAUTI are met, empiric treatment with antibiotics should begin immediately. Consideration of the local antibiogram should always occur, but suggested empiric treatment options are also based upon severity of illness as well as the likelihood of MDRO.

In those who are not seriously ill and when the risk of MDRO is low, empiric options (for up to 7 days) may include:

- Trimethoprim/sulfamethoxazole 160/800 mg by mouth every 12 hours
- Ceftriaxone 1 g IM or IV once daily
- Ciprofloxacin 400 mg IV or 500 mg by mouth twice daily, or
- Levofloxacin 250 mg to 500 mg IV or by mouth once daily

In more ill patients or when MDRO are suspected, empiric options (for 7 to 10 days) may include:

- Cefepime 1 g IV every 12 hours
- Imipenem/cilastatin 500 mg IV every 8-12 hours
- Doripenem 500 mg IV every 8 hours X 10 days, or
- Levofloxacin 750 mg orally or IV every 24 hours

Where applicable, doses should be adjusted based upon renal function. Likewise, a shorter or longer duration of therapy may be required, based on clinical and laboratory findings. Once C&S results are available, transition to a narrower spectrum agent should occur. Also, if C&S reveals fungal infection with *Candida* species, treatment should switch to fluconazole 200 to 400 mg orally or IV daily X 14 days or another appropriate antifungal agent.

### CAUTI and Skilled Nursing Facilities

As a part of F315 – Incontinence, skilled nursing facilities must ensure residents who are continent on admission remain continent “unless his or her clinical condition is or becomes such that continence is not possible to maintain.” Additionally, initiation of a catheter following admission to the facility should be rare, and indwelling catheters, either present upon or following admission, must be eliminated as soon as possible.

Within CMS’ current pilot program to assess infection prevention during transitions of care (refer to S&C 17-09-ALL for more details), section L of the Infection Control Worksheet (ICW) focuses exclusively on indwelling urinary catheters and section M focuses on urinary catheter access and maintenance. Areas of assessment for LTC in the ICW include:

- Prescribers provide a written rationale, consistent with evidence-based guidelines, for the use of a urinary catheter initially and on an ongoing basis
- Only trained personnel who have demonstrated competency may insert urinary catheters
- Hand hygiene is performed before and after manipulating the urinary catheter and gloves are worn
- Urine collection bag is kept below the level of the bladder and off the floor at all times
- Urinary catheter tubing is unobstructed and free of kinking
- Urine bags are emptied using a separate, clean collection container for each resident
- Urine samples are obtained via needleless port and not obtained from the collection bag

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In addition to various quality improvement projects, outcome measurements that have been suggested for surveillance and reporting within a LTC facility include:

- Number of CAUTI episodes per 1000 catheter days
- Average number of days of urinary catheter use per patient
- % of patients who had a urinary catheter placed during their stay

- % of patients admitted with urinary catheter
- % of patients who required replacement of a catheter following an attempt to remove an indwelling catheter

Ongoing surveillance, strict infection control practices, and routine education can each improve outcomes in LTC residents with urinary catheters.

## The Clinical Capsule

### Oral Solid Medications Associated with Risk of Esophageal Injury\*

- by Allen Lefkovitz

Certain oral medications may cause esophageal irritation or ulceration when the individual does not remain upright for an adequate amount of time after administration. Remaining upright for an adequate time following administration and taking these medications with an adequate amount of fluids may reduce the risk of esophageal injury.

Remain Upright for at Least 10 Minutes After Administration	Remain Upright for at Least 30 Minutes After Administration	Remain Upright for 60 Minutes or Longer After Administration
Clindamycin Demeclocycline Doxycycline Minocycline Tetracycline Aspirin/dipyridamole ER Iron-containing products, including vitamins (e.g., ferrous sulfate) Potassium salts (e.g., K-Dur) Nonsteroidal anti-inflammatory drugs (e.g., ibuprofen) Quinidine	Alendronate Etidronate Risedronate	Ibandronate

\*This list is not all-inclusive. Combination products containing any of the above listed medications should also be considered. For additional information on this topic, please refer to Omnicare's "Oral Solid Medications with the Suggestion that the Patient Remain Upright After Administration" tool available at <https://omniview.omnicare.com/>. Products that should not be crushed prior to administration due to gastroesophageal irritation are not represented in this list.



## Bevyxxa™ Capsules

- by Dave Pregizer

<b>Brand Name (Generic Name)</b>	<b>Bevyxxa™ [BEV vix a] (betrixaban) [be TRIX a ban]</b>
<b>How Supplied</b>	40 mg and 80 mg capsules
<b>Therapeutic Class</b>	Factor Xa (FXa) inhibitor
<b>Approved Indication</b>	Prophylaxis of venous thromboembolism (VTE) in adult patients hospitalized for an acute medical illness who are at risk for thromboembolic complications due to moderate or severe restricted mobility and other risk factors for VTE
<b>Usual Dosing</b>	Initial single dose of 160 mg followed by 80 mg once daily, taken at the same time each day with food. Recommended duration of treatment is 35 to 42 days. Reduce dose to 80 mg followed by 40 mg once daily for patients with severe renal impairment (creatinine clearance $\geq$ 15 mL/min to $<$ 30 mL/min).
<b>Select Drug Interactions</b>	Reduce dose of Bevyxxa to 80 mg followed by 40 mg once daily with P-gp inhibitors (e.g., amiodarone, verapamil, ketoconazole, clarithromycin) due to an increased exposure of Bevyxxa. Avoid co-administration with other anticoagulants due to increased risk of bleeding.
<b>Most Common Side Effects</b>	Bleeding
<b>Miscellaneous</b>	Boxed warning: risk of epidural or spinal hematomas in patients receiving neuraxial anesthesia or undergoing spinal puncture. Safety and efficacy have not been established in patients with prosthetic heart valves.
<b>Website</b>	<a href="http://bevyxxa.com">http://bevyxxa.com</a>



## NEW Generic Medications

Generic Name	Brand Name	Date Generic Available
<b>Moxifloxacin 0.5% Ophthalmic Solution</b>	Vigamox® Ophthalmic Solution	7/3/17
<b>Testosterone 30 mg/1.5 mL Topical Solution</b>	Axiron® Topical Solution	6/29/17
<b>Melphalan 2 mg Tablet</b>	Alkeran® Tablets	6/29/17
<b>Doxycycline Hyclate 75 mg and 150 mg Tablet</b>	Acticlate® Tablets	6/20/17

# HealthLine Quiz

– by Steve Law

- 1. Which statement is FALSE about catheter-associated urinary tract infections (CAUTI)?**
  - Most cases of CAUTI are due to the natural flora of the perineum
  - With short-term use of a urinary catheter, the risk of CAUTI increases by 5% for each day it remains in place
  - In LTC, the most common pathogen associated with CAUTI is *Pseudomonas aeruginosa*
  - Asymptomatic bacteriuria approaches 100% in LTC residents with long-term urinary catheters
- 2. Which is NOT a sign and symptom consistent with CAUTI?**
  - Delirium
  - Hypertension
  - Rigors
  - Leukocytosis
- 3. In patients with a urinary catheter, the most appropriate way to obtain a urine sample is from the urine collection bag:**
  - True
  - False
- 4. Which empiric treatment regimen would be the LEAST appropriate for a not seriously ill patient with a CAUTI:**
  - Bactrim DS – 1 tablet orally every 12 hours
  - Levofloxacin 750 mg orally every 24 hours
  - Ciprofloxacin 500 mg orally twice a day
  - Ceftriaxone 1 gram IV once daily
- 5. Which medication would a patient need to remain upright for 60 minutes or longer after administration?**
  - Potassium supplements
  - Alendronate
  - Ibuprofen
  - Ibandronate
- 6. Which statement is TRUE about the new medication Bevyxxa™ (betrixaban)?**
  - It is a Factor Xa (FXa) Inhibitor
  - It is approved for the treatment of VTE
  - The recommended duration of treatment is 21 days
  - It should be taken on an empty stomach

**\*Please note, the HealthLine Quiz is designed to help readers retain information that is relevant to their care setting. It is not an approved source of continuing education credits for healthcare professionals.**

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Answers to the HealthLine Quiz: 1) C 2) B 3) B 4) B 5) D 6) A